The GRODAN Group supplies innovative, sustainable stone wool substrate solutions for the professional horticultural sector. Based on Precision Growing principles, these solutions are particularly applied to the cultivation of vegetables and flowers. In addition to its stone wool substrates, the GRODAN Group also provides tailor-made advice and tools to support Precision Growing and thus facilitate the sustainable production of healthy, safe and tasty fresh produce for consumers.

More information on the GroSens System can be found at
www.grodan.com/grosens

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All our information and advice is compiled with the greatest possible care and in accordance with state of the art technology. However we are unable to assume any liability for the contents. - October 2014

User Manual

HandHeld

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1 Introduction

Thank you for purchasing a GROSENS Handheld. This manual will help you understand the functions of and get the most out of your Handheld.

The hand held has 3 main functionalities:

1. Read out measurements from a sensor
2. Multi measure function. This enables you to take several measurements in the greenhouse that will be reported back in averages and standard deviations. The recordings kan be easily downloaded to an excel file.
3. A logging function. Whit this function, you are able to record a number of measurements over a number of days. The recordings can be downloaded and displayed in an excel file (both measurements as well as a graph.

To export data to an excel file, a small software program needs to be downloaded and installed at a PC. This program called GroSens downloader can be found on our web page www.grodan.com/GroSens. In order to download files to your PC, the Handheld has to be connected to your computer via the supplied USB cable.

If you have a full GroSens Multi measure system, the handheld can also be used to configure your GroSens system.

2 About the GroSens Reader

The READER is a hand-held readout device designed for use with all GROSENS system SENSORs and RECEIVERs made or sold for the GROSENS system.

2.1 Specifications

Battery Type	5 AA
Battery Life	1500 mA hours
Connector Type	Wireless Connection

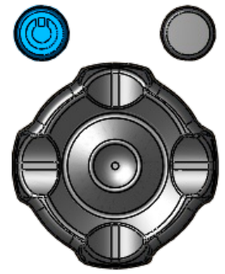
2.2 Components

- GroSens Reader
- GroSens SENSOR
- Pin protector for the GroSens SENSOR
- 2 Radio Antenna
- Mini USB Cable
- Manual

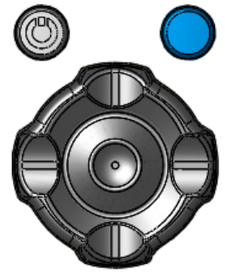
3 Buttons

The READER has seven buttons that can be used to navigate through screens and configure different settings. Below are some diagrams highlighting the buttons as their respective behaviors:

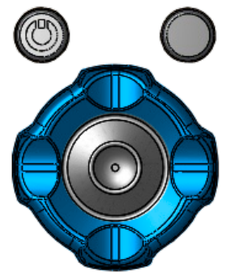
Power
The upper left button is the power button that will either turn the device on or off. After 10 minutes of inactivity, the device will automatically turn off to save power. If held down for more than 4 seconds and then released, the device will restart.



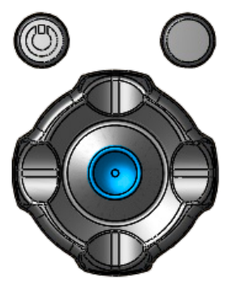
Back
The upper right button is the back button. When pressed it will return the device to the parent screen. Pressing back on a selection screen will cancel any changes that have been made on that screen. In the top menu (Home Menu) the back button has no effect.



Directional Pad
Up, down, left and right buttons are located on the directional pad. Directional buttons are used to navigate through lists and scroll wheels.



Enter
The middle button on the directional pad is the enter button. Pressing the enter button when an item is highlighted will either go to a sub menu or save the highlighted setting to memory. On screens where a scroll wheel is visible, enter has no effect unless the DONE button is highlighted.



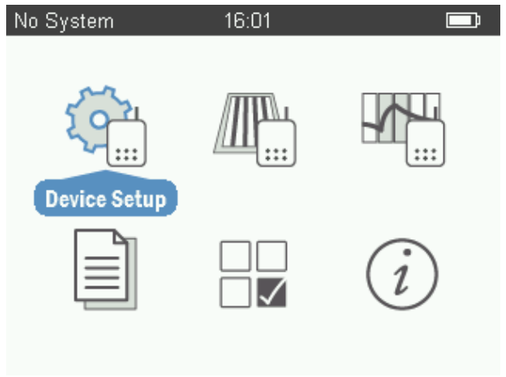
4 Menus

The READER uses a variety of menus to perform basic tasks necessary. Every menu also displays a header that indicates the current GROSENS system (if present) you are connected to, the time of day, the signal strength from the READER to the nearest receiver (if present), and the READER battery level.

4.1 Home Menu

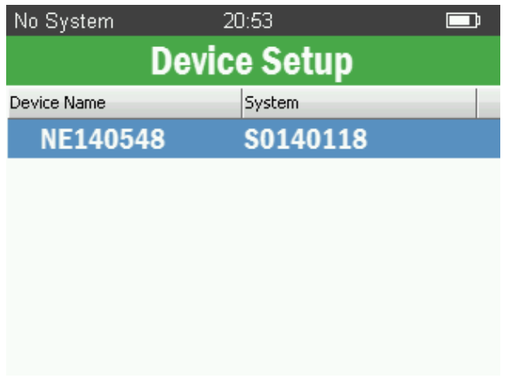
From the Home Menu, you can navigate to the 6 main menus'. Use the left and right buttons to highlight the target menu in blue. Press the enter button to navigate to the selected menu.

1. Devices set-up
2. Multi measurement menu
3. Logging menu
4. Stored files menu
5. Preferences
6. About menu



4.2 Device Menu

The devices menu is used to communicate with the GROSENS SENSOR and RECEIVER (in case of a GroSens multimeasurement system is installed. SENSORs will not connect to a READER until the TEST button on the SENSOR is pressed. RECEIVERs will auto populate in the list if they are connected to the system shown in the upper right hand corner. Use the up and down arrows to select the item you would like to view and press the enter button to open up a screen with detailed information about that specific device.



4.3 Sensor Summary

The SENSOR summary screen shows all the pertinent information about the selected sensor. In the upper left corner is the device's name. When connected to a system, the right side shows the radio signal strength from the SENSOR to the RECEIVER, otherwise it will show the signal strength of the SENSOR to the READER. Also on the right side is the battery level and percentage. The SENSOR battery icon will change to red when it's battery level reaches 20% capacity.

Beneath the device's name, is the currently configured Slab Type. The slab type used is dependent on the slab properties setting. This will either be the READER slab properties or the section slab properties from the SmartBox.

In the main portion of the screen on the right side you can find a live update of the SENSOR's volumetric water content, temperature and electrical conductivity. These values update typically ever two to three seconds and are dependent on the Slab Configuration.

On the right side you can find the SENSOR's Section, Row and Offset configuration. When connected to a system, the location information can be configured and will update in the SmartBox's web interface. Otherwise, the location information is left empty and cannot be configured. When available, use the up and down arrows to select the different location settings. Press enter to edit the setting or press back to return to the Home Menu.

The detail Button is for Future purposes. This is not active at current

---

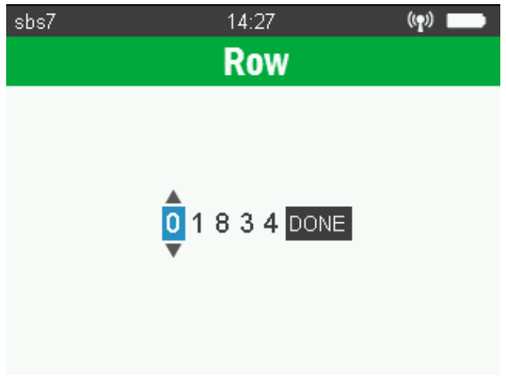
4.3.1 Sections

The Greenhouse section screen shows all the available sections that are configured for the GroSens system. Each section item shows both the greenhouse name as well as the slab type for that section. Use the up and down arrows to select the section you would like to use for this sensor and press the enter button to save the new setting.

4.3.2 Row and Offset

The row and offset screens allow the configuration of each SENSOR's location so that you can keep track of the location of each sensor to make them easier to find after the growing season is over. Use the up and down arrows to change each highlighted number. Press left and right to navigate between digits. Press back to cancel any changes and press enter when DONE is highlighted to save your changes to the device.

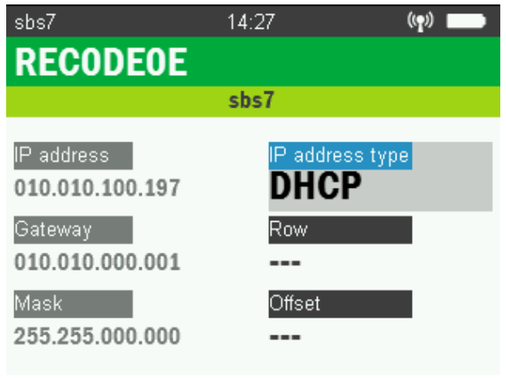
Note: This may be used in the future to help determine optimal distances between a SENSOR and a RECEIVER.



4.4 Receiver Summary

The RECEIVER summary screen shows all the pertinent information about the selected receiver. In the upper left corner is the device name. Beneath the name, is the system that the receiver is currently paired with.
In the main portion of the screen on the left side you can find the RECEIVER's IP address, Gateway and Mask settings it's using for the connected network.

On the right side you can find the RECEIVER'S IP address type, Row and Offset configuration. When the IP address type is DHCP, the left hand side of the screen cannot be modified. When the IP address type is Static, you can use the left hand side of the screen to manually configure the RECEIVER's system settings.



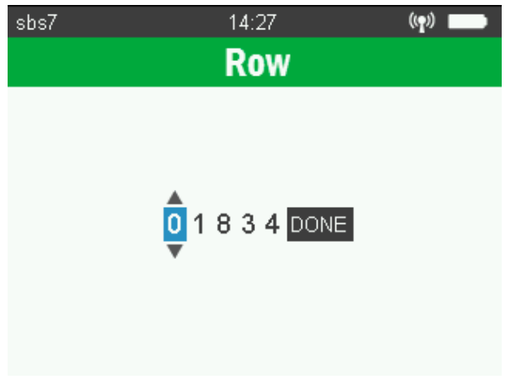
4.4.1 Network Configuration

The IP address, mask and gateway for the target network can be configured in screens like the IP address screen above. Use the up and down arrows to change each highlighted number. Press left and right to navigate between digits. Press back to cancel any changes and press enter when DONE is highlighted to save your changes to the device.

4.4.2 Row and Offset (Reserved for future use)

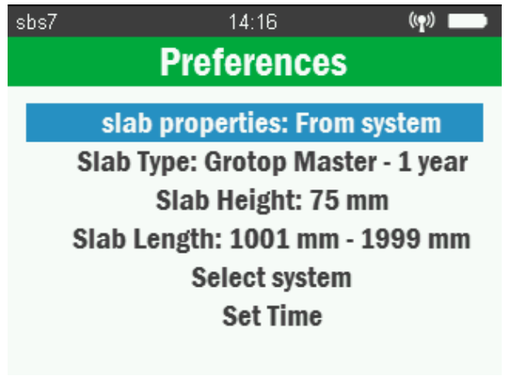
The row and offset screens allow configuring of each RECEIVER's location so that you can keep track of the location of each RECEIVER to make them easier to find after the growing season is over. Use the up and down arrows to change each highlighted number. Press left and right to navigate between digits. Press back to cancel any changes and press enter when DONE is highlighted to save your changes to the device.

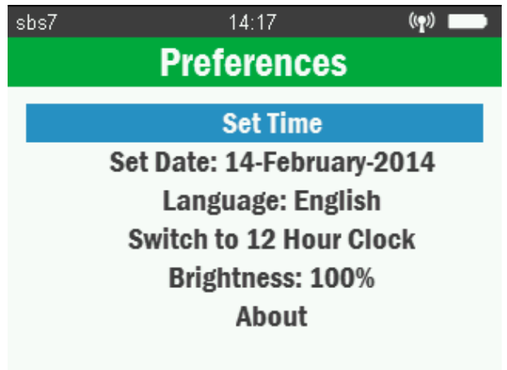
Note: This may be used in the future to help determine optimal distances between a SENSOR and a RECEIVER.



4.5 Preferences Menu

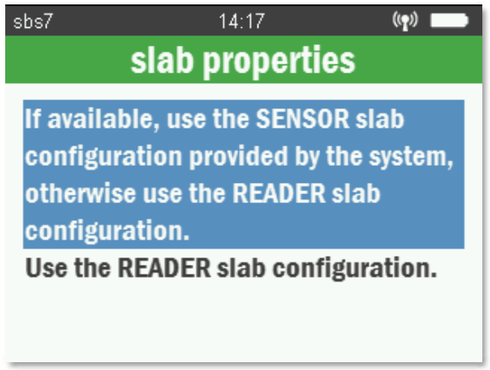
The preferences menu allows you to configure various universal settings on the device. Use the up and down arrows to select the target preference and press the enter button to edit the setting or press back to return to the Home Menu.





4.6 Slab Properties

Slab Properties allows you to specify the source of slab settings to use with a SENSOR. Each sensor can be tied to a section and each section can have it's own slab properties. The slab properties can be set using the Reader or the Smartbox.


sbs7
14:17
slab properties
If available, use the SENSOR slab configuration provided by the system, otherwise use the READER slab configuration.
Use the READER slab configuration.

4.7 Slab Type

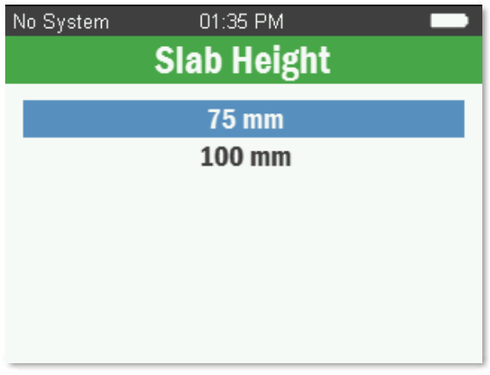
You can use the reader to select a slabtype to be used for Sensor measurements. You can select any of GRODAN's substrates, or select a specific fiber direction (X, Y, and Z). Use the up and down arrows to select the target slab type and press the enter button to save the setting or press the back button to return to the Preferences Menu without saving your changes.

Note: Slab Properties must be set to "Use the READER slab configuration" for this configuration to take effect.

4.8 Slab Height

Slab height is used to indicate which height the GROSENS SENSOR is placed. This is important for SENSOR measurements. Use the up and down arrows to select the target slab height and press the enter button to save the setting or press the back button to return to the Preferences Menu without saving your changes.

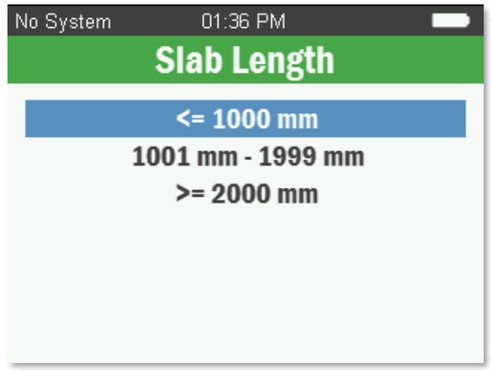
Note: Slab Properties must be set to "Use the READER slab configuration" for this configuration to take effect.



4.9 Slab Length

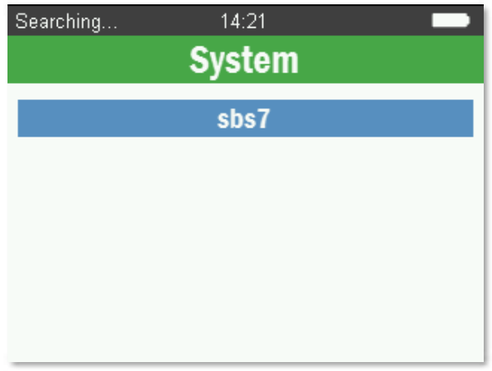
Slab length is used to indicate the length of the slab and is important for SENSOR measurements. Use the up and down arrows to select the target slab length and press the enter button to save the setting or press the back button to return to the Preferences Menu without saving your changes.

Note: Slab Properties must be set to "Use the READER slab configuration" for this configuration to take effect.



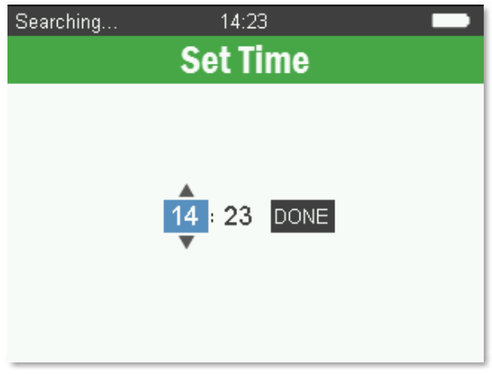
4.10 Select System

Select System allows you to view all the systems within range of the READER. Select the system that you would like to pair with. When viewing other devices, you will be prompted to pair any device that isn't configured with the same system name.



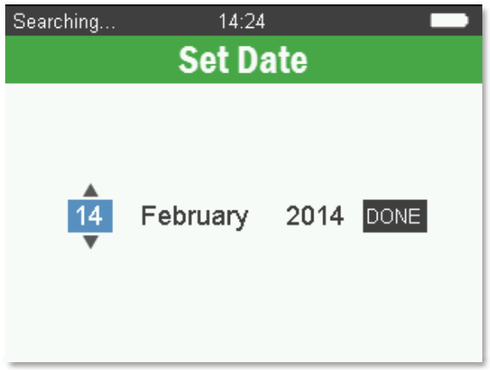
4.11 Set Time

The time setting will synchronize with a connected GRODAN GROSENS system. If no system is selected, then the time can be configured with this screen. Use the left and right arrows to select the target time component and use the up and down arrows to adjust the component setting. To save the settings, navigate to the DONE button using the right arrow and press enter. Press the back button at any time to return to the Preferences Menu without saving your changes.



4.12 Set Date

The date setting will synchronize with a connected GRODAN GROSENS system. If no system is selected, then the date can be configured with this screen. Use the left and right arrows to select the target date component and use the up and down arrows to adjust the component setting. To save the settings, navigate to the DONE button using the right arrow and press enter. Press the back button at any time to return to the Preferences Menu without saving your changes.

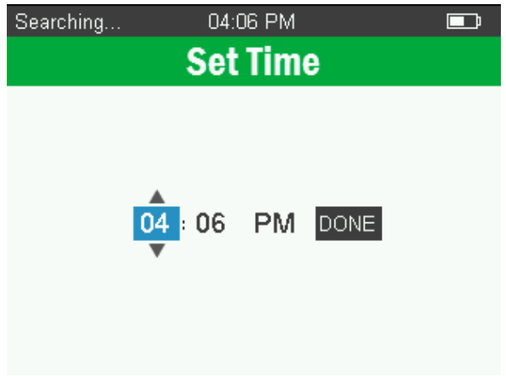


4.13 Language

The language menu will update all the text on the screens to the selected language including the characters used. Use the up and down arrows to select a language and press the enter button to save the setting or press the back button to return to the Preferences Menu without saving your changes.

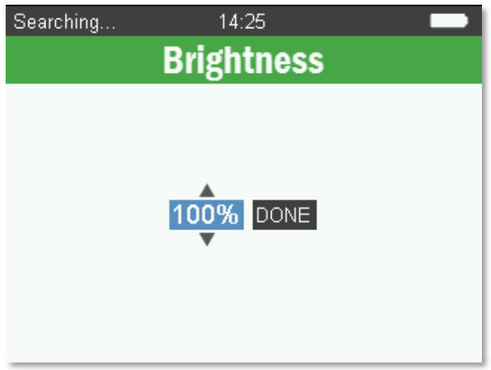
4.14 Switch to 24 Hour Clock

This setting is used to toggle the time format in the screen headers between 24 hour and 12 hour AM / PM formats. Press the enter button when this option is highlighted to change the setting.



4.15 Brightness

If you need to change the brightness of the display for better viewing, you can do so by changing the brightness level. The higher the brightness the more battery power is required and consequently the less time a set of batteries will last. Use the up and down arrows to adjust the brightness setting. To save the settings, navigate to the DONE button using the right arrow and press enter. Press the back button at any time to return to the Preferences Menu without saving your changes.

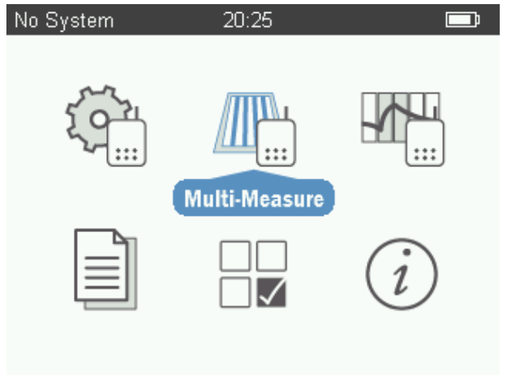


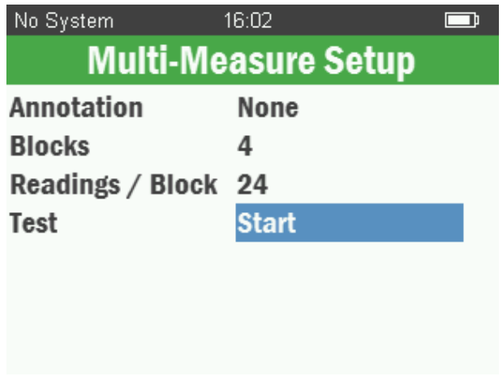
5 About

The About screen shows the device serial number, the firmware version and copyright notices. The firmware version is also visible in the lower right hand corner of the splash screen. In the event that you need to contact customer support regarding your GROSENS READER, please be sure to inform the customer support specialist of your GROSENS READER's serial number and firmware version

6 Multi measurements

When the multi measurement function is selected (above), you will enter in the multimeasurement setup (below)





6.1 Create a File

When selecting the multi measurement function (hitting enter), a file has to be created. In the multi measurement setup has to be defined.

6.2 Annotation – create name for the file

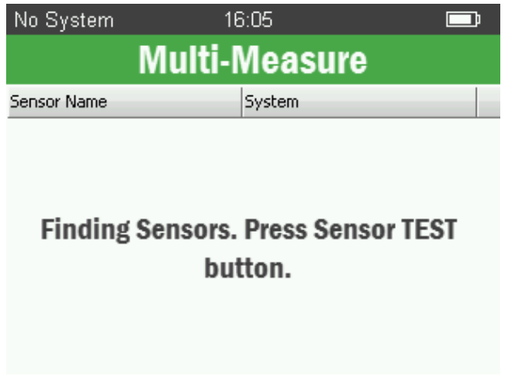
Annotation (hit enter when it lights up un blue) will take you to the above shown screen. By using up and down arrows you can define the name for the file. When done, hit enter.

6.3 Blocks

Define how many sections/different slab types you want to measure. Each slabtype or section should be 1 block. You can set the number by hitting enter if the Blocks appears blue, use the up and down arrows to set the number. Select done and hit enter when ready.

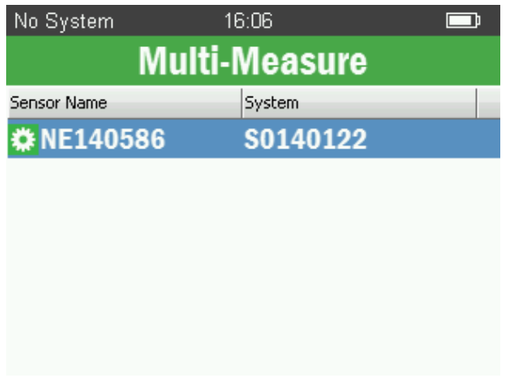
6.4 Test

Hit start when ready.



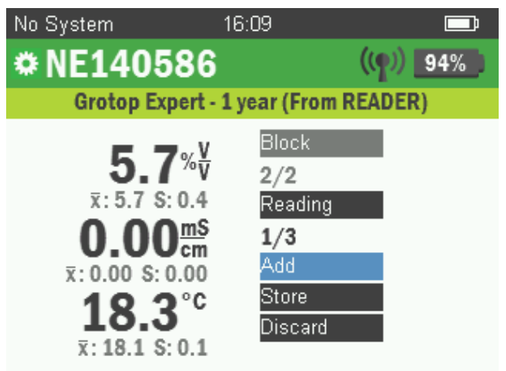
6.5 Activate sensor

After the file is created, the reader will ask to push the sensor button. The number of the sensor the button is push appears in the screen and is highlighted. Push enter to select.



6.6 Start measurements

The device is now ready to do measurements. On the left side the actual reading is given. On the right side information is given on what block and what reading you are. In the above given example you are about to conduct the first reading (1 out of 3) of the second block (2).



6.7 Add

When a reading is ok, you should click the add button (it should be highlighted in blue and click enter). When hitting enter, the add button will light up for about 3 seconds. After that the reading on the display will show 2/3. Below the measure value the average and standard deviation of all readings until that moment are given.

Note:

- *After the sensor is inserted in a slab, it will take up to 10 seconds for the final reading appears. It is recommended to wait 10 seconds before hitting the Add button)*
- *If very low values on WC (<10%) or EC readings of 0,00 appear, the sensor was exposed to air and readings are not representative for a slab measurement*

6.8 Store – break in multi measurement session

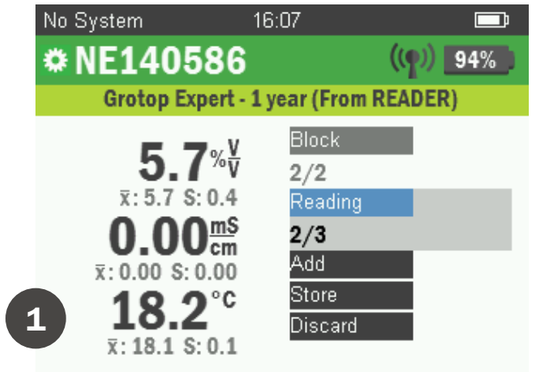
Whit this function, all measurement that are taken are stored. This button should be used if you want to stop with the measurements.

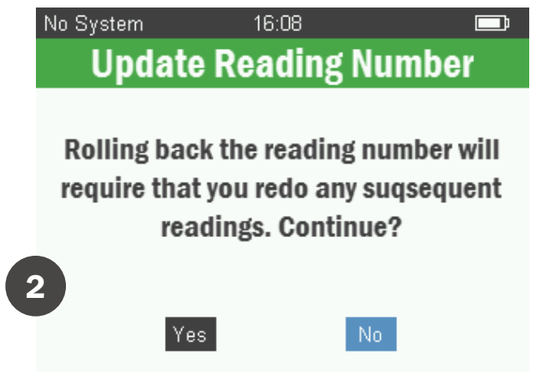
Stopping and restarting a measurement session

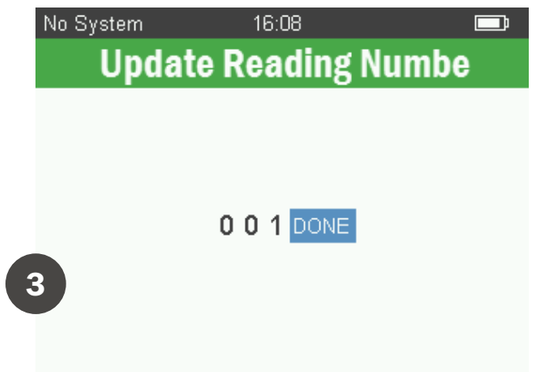
- *If one wants to break of a measurement session before all blocks or measurements are taken, you should hit the store button to store data in the file.*
- *If you want to continue the measurement you simply start up the multi measurement function again. The screen will ask whether you want to resume the unfinished session or start a new file. When Resume is chosen, the old session will continue. When a New is chosen, I new file can be created and a new session started.*

6.9 Reading – correct a reading

If you used the add button to quick and a false measurement was stored, this can be deleted by select the reading function. Make sure reading is blue and hit the enter button. A new screen will appear and ask you whether you really want to delete measurements. Click yes to proceed. In the next screen you have to select what reading what was good and enter that number. It will take you back to that number. All data after that number will be deleted.







6.10 Discard – Delete all measurements

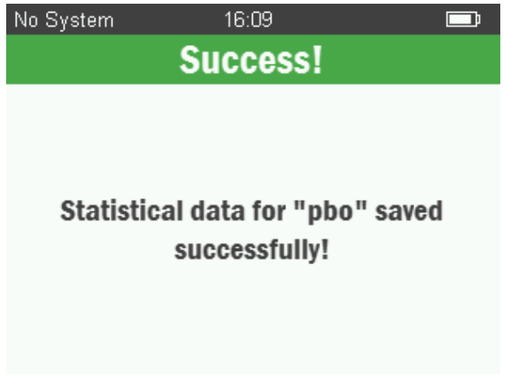
Selecting this function will delete all (stored) data of that file.

An Example. Lets assume that measurement3 from 6 was wrong:

- *The screen will indicate 4/6 > meaning that reading 4 will be the next reading*
- *Select reading*
- *Confirm yes that you want to change*
- *Select number 3 to go back to and select done*
- *Your screen will now show 3/6 > the old 3 is deleted and the next measurement you are about to take is number 3.*
- *If you role back more numbers (fe from 6 back to 2, all numbers after 2 will be deleted, in this case readings 3, 4,5.*

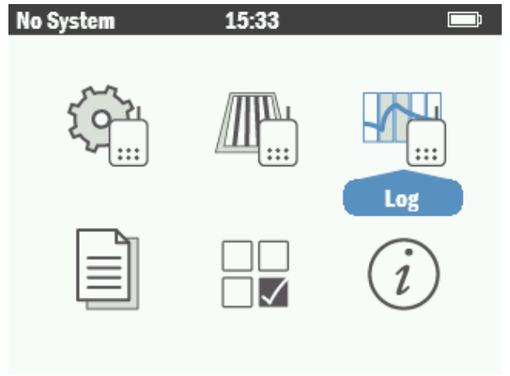
6.11 End of measurement session

Once all blocks and readings are completed, the data will be automatically stored.



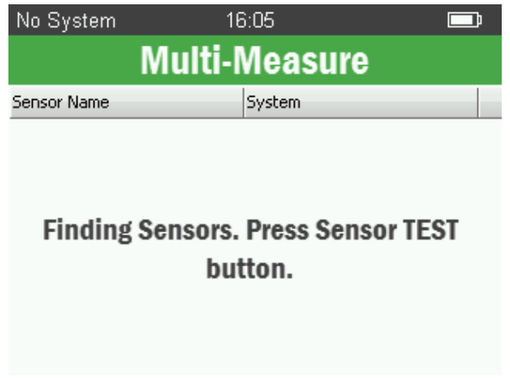
7 Logging function

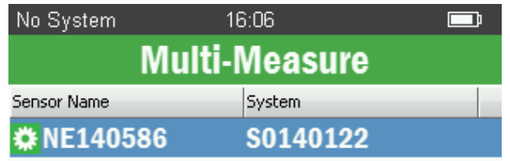
Select the multifunction button in the main menu to start up the logging function



7.1 Activate sensor

After the logging function button is pushed, the reader will ask to push the sensor button. The number of the sensor appears in the screen and is highlighted. Push enter to select.





7.2 Main screen – start logging

The main logging screen appears. In the top line the sensor number is shown that is activated. To start logging, select Log and hit enter. The log function now will show on.

7.3 Interval

With the interval function, the time can be chosen after how many minutes a reading is taken. In the example above 3 minutes is chosen. Use the up and down buttons to select the appropriate interval.

7.4 Duration

With this function you can set how many days the logging should take place. Lowest duration is 1 day but up to 14 days are possible.

7.5 Actual logging

With the logging on and interval and duration is set, the logging automatically will start. The actual logging of data takes place on the sensor. Therefore it is not necessary to keep the reader on or close to the sensor. The screen can be closed by hitting the back button and the reader can be taken back to the office

7.6 Check status of logging

The status of logging can be checked by selecting the log function, select the sensor by hitting the test button of the programmed sensor. The log screen will appear again and in the bottom of the screen the number of records logged will be displayed.

7.7 Finalizing – stopping

The logging will automatically stop when the set duration is reached. If you want to stop the logging earlier, this can be done by pushing the download button.

7.8 Downloading – creating a file name

To download the data from the sensor, hit the download button. Now the annotation screens appears again and will give to add text or a name to the downloaded data file. The sensor number always will be given but text can be added afterwards.

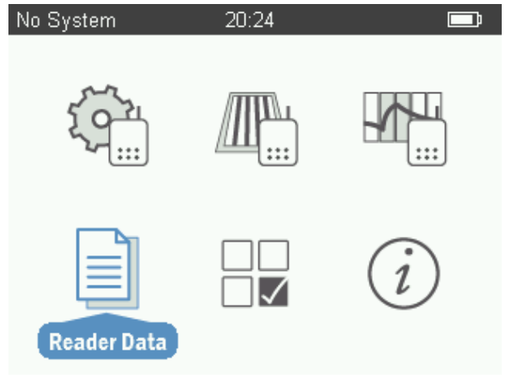
After creating a filename, the actual downloading from the sensor will take place, the progress will be shown in the screen of the reader.

7.9 Important attention points

1. The reader should be close to the sensor while downloading the data.
2. For a larger amount of data (fe. 5 days of logging, every 3 minutes) the download time can take up to 6 minutes.
3. Downloading will erase all data from the sensor and store it on the reader in a log file.

8 Stored files on reader

All files that are recorded, in multi measurements files or logging files and stored on the reader can be viewed in the Reader Data section



8.1 Reader data overview

When clicking on the reader data overview, a screen is displayed that gives an overview of all on the reader stored files.

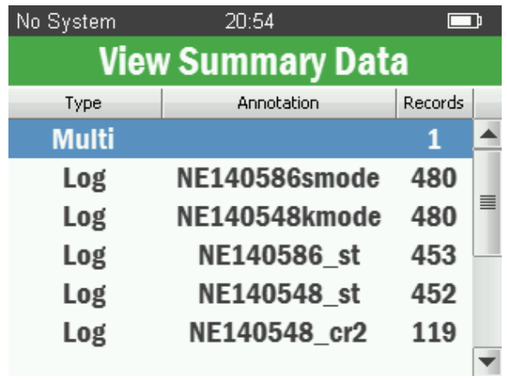
In this screen 3 types of information is displayed:

Type: indicating whether a file is a file that contains multi measurement data or logging data

Annotation: The name that has been given to a file. For logging files, the annotation also indicates the name of the sensor that supplied the logging data.

Records: The number of measurements that a file contains. Each record is a group of 3 measurements (WC, EC and Temp) and an id number and timestamp.

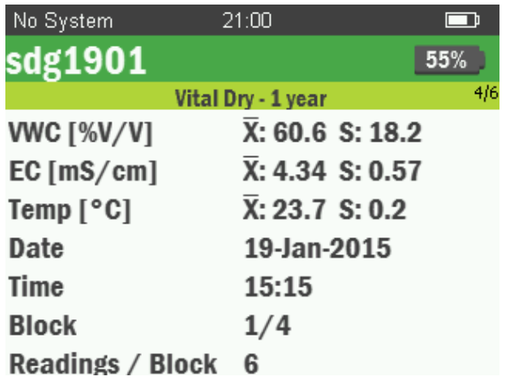
By using the up and down arrow keys, one can browse through the various files.



8.2 Viewing multi-measurement files – summary on reader

When a multi measurement file is highlighted, by clicking the enter button, a summary of the measured data is displayed:

1. The average and standard deviation on WC, EC and Temperature per measured block is given.
2. By using the up and down and enter key, one can view the averages on each measured block. In the display behind block is indicated what block is presented (1/4 – 2/4, etc).
3. Date and time are given when the measurements were recorded.
4. The number of measurements taken per block are indicated behind reading/block



7.3 Download files and detail display on a computer (in excel).

See chapter 8.

9 Downloader program - downloading files to PC

9.1 Introduction – how to obtain the GroSens Downloader program.

In order to download measurement files to your Computer you need to install a small program called GroSens Downloader on your PC. This program will automatically install on your computer if you click on the link below (hold the ctrl key and click on the link).

Please follow the instructions during the installation process. The program will install an Icon for this program on your desktop. When clicking on this Icon the program will start. Below you find a screenshot on what the program looks like.

http://decagon.com/grosens/GrosensDownloaderInstaller-v1.0.151.exe

9.2 Getting started – connect your reader and start de software program

When you connect the reader to your PC with the USB cable and start up the GroSens Downloader program, by pushing on download, data will be downloaded to your PC. Data will be stored as excel files and can be opened in Excel. To operate in this Software program, always have your reader connected to the PC! through the various files.

9.3 Basic functions – Download and Erase functions

When you click on Download, all files stored on your reader will bedownloaded at once onto your computer in an excel format. After downloading, files will remain also available on the reader.

By clicking Erase, all data stored on your reader will be deleted!

9.4 Sub menu's - File menu

When you click on the "file"menu , the main function are shown again (Erase and download).

9.5 Sub menu – Edit

In this menu you can select in what form the files are downloaded. Standard this is set in an excel format (.xlxs). It is also possible to download data in a .csv format. In order to do this, selct preferences and than bookmark the csv function.

9.6 Sub menu – Actions.

In this menu you can:

Set reader date/time

Set the correct date and time on the reader

Update sensor firmware

install the latest firmware on your GroSens sensors. When clicking on this function – follow the instructions that appear on the screen – you can make sure that all your GroSens sensors have the latest firmware installed. The sensor have to be close to the reader in order to do this.

Set Sensor mode

with this function, the sensor can be set in system or kitt mode. Ask your Grodan specialist on how and when to use this function.

9.7 Sub menu - Help

There are 4 functions in this menu:

1. **Sent feedback to Grodan:** not active at the moment
2. **Check for software updates:** check if a newer version of the GroSens Downloader program is available. If available, the newest version will be installed on your PC – follow the instructions on your screen.
3. **Check for firmware updates:** this will check for the latest software on your reader. If a newer version is available, this will be installed on your reader. Follow instructions on the screen.
4. **About GroSens Downloader:** not active at the moment.

9.8 Example of Excel files – multi measurement

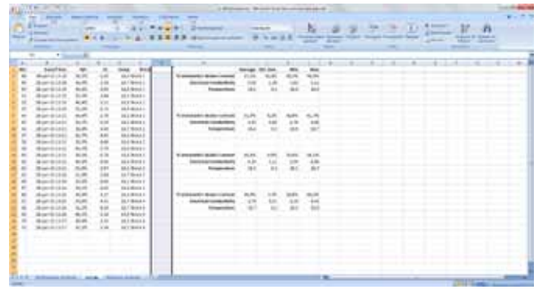
The results of a multi measurement session will be presented in 3 different sheets:

1. In the first sheet - multi measurement summary - the averages of the measured blocks are given, as well as basic data on slabtype and when the measurements were done
2. In sheet 2 – details - all individual measurements and (again) the averages are presented.
3. In sheet 3 – main hardware information is found (serial numbers of devices – softwareversions etc).

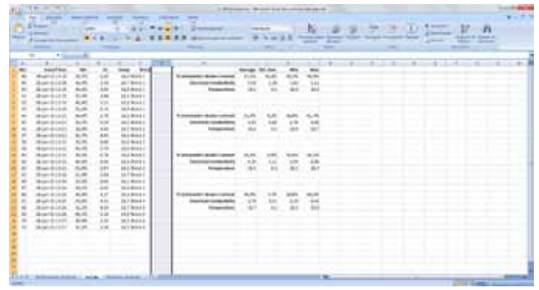
Please note that all data in the excel file can be worked with as in a normal excel file.

Some examples are presented below:

Sheet 1 – Multimeasurement summary



Sheet 2 - details



Sheet 3 – hardware summary

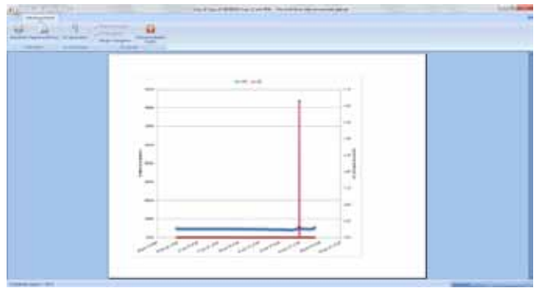
9.9 Example of Excel files – logging measurement

The results of a logging session will be presented in 4 different sheets:

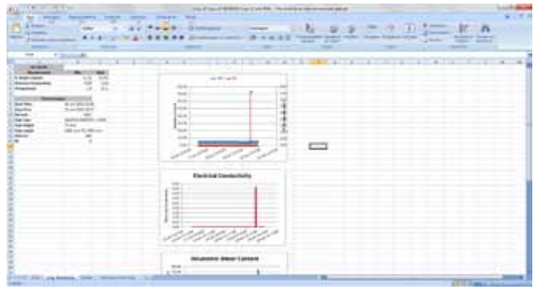
1. In the first sheet – Chart – all logged data on WC, EC and temperature are presented in one graph.
2. In the second sheet - log summary - the min max values logged on WC, EC and Temperature are given, as well as the individual graphs on WC, EC and Temperature. Furthermore basic data on slab type and when the measurements were done
3. In sheet 3 – details - all individual measurements are presented.
4. In sheet 4 – main hardware information is found (serial numbers of devices – software versions etc).

Please note that all data in the excel file can be worked with as in a normal excel file.

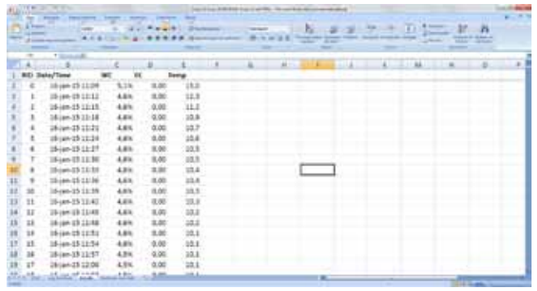
Some examples are presented below:



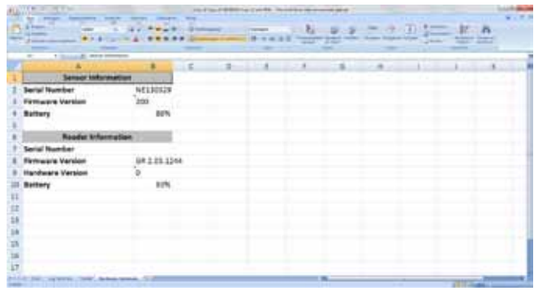
Sheet 1 - chart



Sheet 2 – log summary



Sheet 3 - details

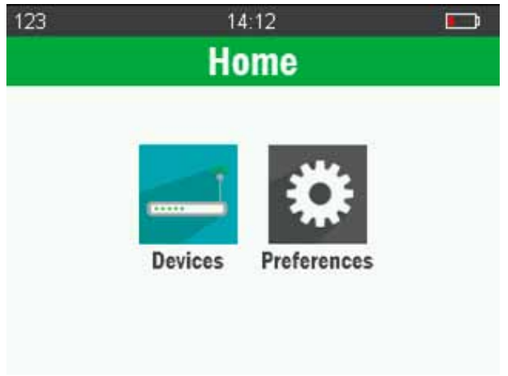


Sheet 4 – Hardware summary

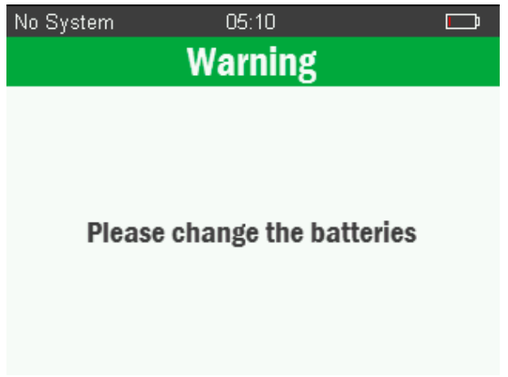
10 Low Batteries and Dead Batteries

10.1 Low Batteries

When the battery level reaches 20%, the battery icon in the upper right corner of the screen will turn red. The device will continue to operate normally.



When the battery level is less than 5%, a warning screen is displayed asking the user to put in new batteries. The warning screen will remain visible until the batteries are changed or the device is turned off. All buttons are disabled except the Power button, which allows the device to be turned off before the batteries are removed.



10.2 Dead Batteries

When the batteries are dead, the device will turn off and remain off. All of the buttons are disabled, so pressing the power button will not turn it back on. The old batteries will have to be replace with new ones in order for the device to function normally again. After new batteries are put in, the device will start up automatically. If the device hasn't started up after 10 seconds, hold down the power button for more than 4 seconds and release it in order to restart the device.

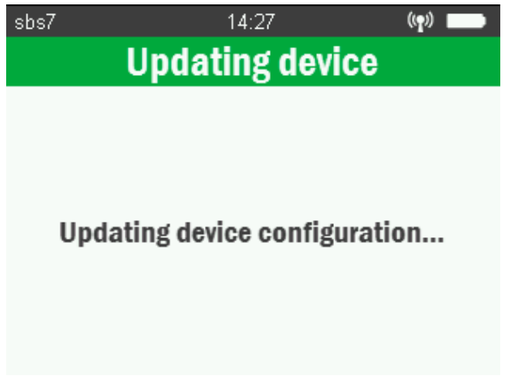
11 Troubleshooting

11.1 Device won't turn on or keeps resetting

This issue is typically caused depleted batteries or batteries that have been put in backwards into the device. Open the battery cover on the back of the READER. Confirm that the batteries are oriented correctly. If they are oriented correctly, then replace the batteries. Most likely the READER's batteries are too low to function properly.

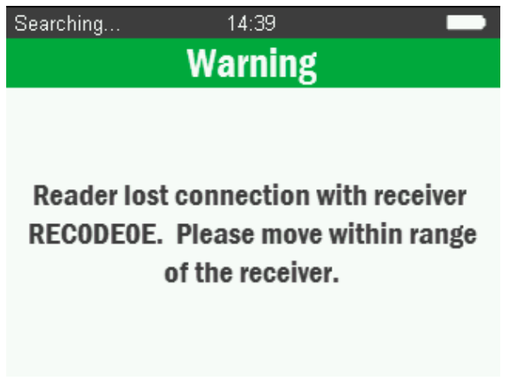
11.2 *Updating Device* screen is frozen

Sometimes it may take up to 10 seconds to save the new settings onto the target device. If it takes longer than this, the READER is probably having trouble talking to the target device. Move closer to the target device, then press back and try again. If you continue to have problems please make sure that the SENSOR is running at least version 1.12 and the RECEIVER is running at least version 1.10. You can update these through the SmartBox interface.



11.3 Lost Connection with SENSOR

Most likely, the READER is having trouble talking to the target SENSOR. Move closer to the target device, press back button on the READER to return to the device list. Press the TEST button on the sensor to reconnect with the READER. If you continue to have problems please make sure that the SENSOR is running at least version FW version – Contact Grodan Customer service for this.



11.4 Lost Connection with RECEIVER

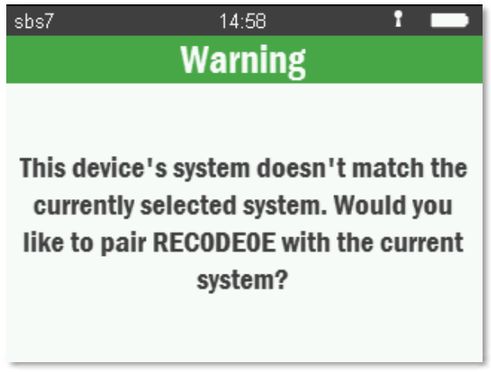
Most likely, the READER is having trouble talking to the target RECEIVER. Move closer to the target device, and then press back and try again. If you continue to have problems please make sure that the RECEIVER is running at least version Firm ware version – contact Grodan customer service for this.

11.5 Device's System doesn't match the one on the READER.

This screen can be caused by one of the following scenarios:

1. There are multiple GroSens systems within range of the READER
2. The target device is new and hasn't been properly paired with the GroSens system.
3. The target device was used with a different GroSens system.
4. The GroSens system name was changed in the Smartbox.

In order to configure a device, it must be using the same system that the READER is using. Pairing the target device with system the READER is using should resolve this problem. If the wrong system is selected in the upper left corner of the screen, navigate to the preferences menu and select the correct system first before communicating with the target device.


sbs7
14:58
Warning
This device's system doesn't match the currently selected system. Would you like to pair RECODE0E with the current system?

12 Radio Frequency - declaration of Conformity

12.1 European kitt: European and Russia

The Grodan GroSens wireless sensing system uses license-free radio frequencies to communicate sensor data. These wireless devices constitute 'short range device' (SRD).

Applicable Material Numbers:	GroSens Sensor 132253, GroSens Receiver 132256, GroSens Reader 132260, (EUR system)
Operating Frequency Range:	863-870 MHz (868 ISM band)
Maximum Output Power:	25 mW (14 dBm) effective radiated power (e.r.p.)
Interference Avoidance Technology:	Listen Before Talk (LBT) + Automatic Frequency Agility (AFA)

EC Declaration of Conformity (for Europe and additional locales)

These products are in conformity with the essential and relevant requirements of the EU Directive 1999/5/EC R&TTE and the EU Directive 2011/65/EU RoHS2

Safety: (article 3.1a)	EN60950-1:2006+A12:2011, EN 62311:2008
EMC: (article 3.1b)	ETSI EN 301 489-1 V1.9.2 (2011-09) in accordance with ETSI EN 301 489-3 V1.4.1 (2002-08)
Spectrum: (article 3.2)	ETSI EN 300 220-2 V2.3.1 (2010-02)

CE

12.2 NA – kitt: North America and Australia

The Grodan GroSens wireless sensing system uses license-free radio frequencies to communicate sensor data. These wireless devices constitute 'short range device' (SRD).

Applicable Material Numbers:	GroSens Sensor 132254, GroSens Receiver 132258, GroSens Reader 132261, (CAN/USA/AUS system)
Operating Frequency Range:	915.6-927.6 MHz (900 MHz ISM band)
Maximum Output Power:	250 mW (24 dBm) effective radiated power (e.r.p.)
Interference Avoidance Technology:	Frequency Hopping Spread Spectrum (FHSS)

EC Declaration of Conformity (for USA)

The devices comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

Contains FCC ID:	MCQ-XB900HP

FC

Industry Canada Declaration of Conformity

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement

Contains IC ID:	1846A-XB900HP

C-Tick Declaration of Conformity (for Australia)

The devices comply with Radiocommunications (Short Range Devices) Standard 2004.

ACMA:	N30375

12.3 Row-lite kitt (Japan)

The Grodan GroSens wireless sensing system uses license-free radio frequencies to communicate sensor data. These wireless devices constitute 'short range device' (SRD).

Applicable Material Numbers:	GroSens Sensor 188180, GroSens Receiver 188179, GroSens Reader 188181, (RoW-Lite system)
Operating Frequency Range:	2410-2465 MHz (2.4GHz ISM band)
Maximum Output Power:	10 mW (10 dBm) effective radiated power (e.r.p.)
Interference Avoidance Technology:	Direct Sequence of Multiple Channels

EC Declaration of Conformity (for Europe and additional locales)

These products are in conformity with the essential and relevant requirements of the Directive 2004/108/EC (EMC), Directive 2006/95/EC (LVD) and Council Directive 1999/5/EC R&TTE.

Safety: (article 3.1a)	EN60950-1:2006/A12:2011, EN 62311:2008
EMC: (article 3.1b)	ETSI EN 301 489-1 V1.8.1 (2008-04) in accordance with ETSI EN 301 489-17 V2.1.1 (2009-08)
Spectrum: (article 3.2)	ETSI EN 300 328 V1.7.1 (2006-10)

CE

FCC Declaration of Conformity (for USA)

The devices comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

Contains FCC ID:	OUR-XBEEPRO

FC

Industry Canada Declaration of Conformity
The devices comply with all applicable requirements of the Industry Canada specifications RSS-210.

Contains IC ID: 4214A-XBEEPRO

C-Tick Declaration of Conformity (for Australia and New Zealand)
The devices comply with Radiocommunications (Short Range Devices) Standard 2004.

ACMA: N136, Z1123

Japan Declaration of Conformity
The listed products comply with the Technical Regulations Conformity Certification of Specified Radio equipment (ordinance of MPT N° 37,1981).

ID: 005NYCA0378

R201 WW
0821511

12.4 Row-kitt: New Zealand and other countries.
The Grodan GroSens wireless sensing system uses license-free radio frequencies to communicate sensor data. These wireless devices constitute 'short range device' (SRD).

Applicable Material Numbers: GroSens Sensor 132255, GroSens Receiver 132259, GroSens Reader 132262, (RoW system)

Operating Frequency Range: 2410-2465 MHz (2.4GHz ISM band)
Maximum Output Power: 63 mW (18 dBm) effective radiated power (e.r.p.)
Interference Avoidance Technology: Direct Sequence of Multiple Channels

FCC Declaration of Conformity (for USA)
The devices comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

Contains FCC ID: OUR-XBEEPRO

Industry Canada Declaration of Conformity
The devices comply with all applicable requirements of the Industry Canada specifications RSS-210.

Contains IC ID: 4214A-XBEEPRO

C-Tick Declaration of Conformity (for Australia and New Zealand)
The devices comply with Radiocommunications (Short Range Devices) Standard 2004.

ACMA: N136, Z1123

Notes

Notes